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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LEWIS, MONICA

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 12/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/887,827

Applicant(s)

ABYS ET AL.

Examiner

Monica Lewis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 7-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment filed October 14, 2005.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-6 and 11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The Applicant has amended the claims to state that a layer of tin or tin alloy is in "an intrinsic tensile stress state" (See Claim 1). However, the Applicant has not disclosed or defined "an **intrinsic** tensile stress state" in the specification. Claims 2-6 and 11 depend directly or indirectly from a rejected claim and are, therefore, also rejected under 35 U.S.C. 112, second paragraph for the reasons set above.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-6 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear what is meant by the following: a) "intrinsic tensile stress state" (See Claim 1). Applicant has failed to define what is meant by "intrinsic tensile stress state. Therefore, the Examiner is allowed to give the broadest reasonable

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interpretation. Claims 2-6 and 11 depend directly or indirectly from a rejected claim and are, therefore, also rejected under 35 U.S.C. 112, second paragraph for the reasons set above.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3, 5 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by

Superplasticity in Electroplated Composites of Lead and Tin by Martin et al.

In regards to claim 1, Martin et al. (“Martin”) discloses the following:

a) a metal substrate (For Example: See Page 352 under the Experimental Section);
and

b) overlying the substrate a surface finish comprising a layer of tin or tin alloy in an intrinsic tensile stress state (For Example: See Pages 352-356).

In regards to claim 3, Martin discloses the following:

a) the average tensile stress is in excess of about 2 Mpa (For Example: See Figure 5).

Additionally, the applicant has not established the critical nature of the dimension of stress which is in excess of about 2 MPa. “The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.” *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990).

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In regards to claim 5, Martin discloses the following:

a) the tin or tin alloy has a thickness in the range .5 to 10 micrometers (For Example: See Page 352).

Additionally, the applicant has not established the critical nature of the tin or tin alloy has a thickness in the range .5 to 10 micrometers. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990).

In regards to claim 11, Martin discloses the following:

a) the tensile stress inhibits whisker growth.

Although Martin fails to specifically disclose the limitations listed above, the same material is utilized in Martin as in Applicant's invention therefore it would have the same characteristics. (Note: Therefore, if you have stress you inherently inhibit whisker growth. Stress is related to whisker growth but by lowering the stress you inhibit whisker growth (i.e. lower stress, lower whisker growth)).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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9. Claim 2 is rejected under 35 U.S.C. 103(a) as obvious over *Superplasticity in Electroplated Composites of Lead and Tin* by Martin et al. in view of Tsujita et al. (Japanese Patent No. 51-143533).

In regards to claim 2, Martin fails to disclose the following:

a) a layer of tin or tin alloy has an average grain size in excess of about 1 micrometer.

However, Tsujita et al. ("Tsujita") discloses a semiconductor device that has a layer of tin or tin alloy has an average grain size in excess of about 1 micrometer (For Example: See Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Martin to include a grain size in excess of about 1 micrometer as disclosed in Tsujita because it aids in reducing the formation of whiskers (For Example: See Abstract).

Additionally, since Martin and Tsujita are both from the same field of endeavor, the purpose disclosed by Tsujita would have been recognized in the pertinent art of Martin.

Finally, the applicant has not established the critical nature of the dimension of grain size in excess of about 1 micrometer. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990).

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10. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as obvious over *Superplasticity in Electroplated Composites of Lead and Tin* by Martin et al. in view of Herber et al. (U.S. Publication No. 2002/0187364).

In regards to claim 4, Martin discloses the following:

a) tensile stress in the layer of tin or tin alloy (For Example: See Pages 352-356).

In regards to claim 4, Martin fails to disclose the following:

a) an underlayer of nickel, nickel alloy, cobalt, cobalt alloy, iron or iron alloy.

However, Herber et al. ("Herber") discloses a semiconductor device that has a nickel underlayer (For Example: See Paragraph 4). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Martin to include a nickel underlayer as disclosed in Herber because it aids in reducing the formation of whiskers (For Example: See Paragraph 4).

Additionally, since Martin and Herber are both from the same field of endeavor, the purpose disclosed by Herber would have been recognized in the pertinent art of Martin.

In regards to claim 6, Martin fails to disclose the following:

a) the underlayer has a thickness in the range of 0-20 micrometers.

However, Herber discloses a semiconductor device that has a nickel underlayer, which has a thickness in the range of 0-20 micrometers (For Example: See Paragraph 4). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Martin to include a nickel underlayer, which has a thickness in the range of 0-20 micrometers as disclosed in Herber because it aids in reducing the formation of whiskers (For Example: See Paragraph 4).

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Additionally, since Martin and Herber are both from the same field of endeavor, the purpose disclosed by Herber would have been recognized in the pertinent art of Martin.

Finally, the applicant has not established the critical nature of the dimension of underlayer which has a thickness in the range of 0-20 micrometers. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990).

Response to Arguments

11. Applicant's arguments filed 10/14/05 have been fully considered but they are not persuasive. Applicant argues that Martin fails to expressly disclose "that the tensile stress state is intrinsic to the tin or tin alloy film." However, since the deposited film is not subjected to any external force, the stress referred to by Martin must be intrinsic. Furthermore, the Applicant has not disclosed or defined "an **intrinsic** tensile stress state" in the specification. Therefore, the Examiner is allowed to give the broadest reasonable interpretation. Merriam-Webster defines intrinsic as "originating and included wholly within an organ or part." Martin discloses that the layers are deposited upon one another, therefore an intrinsic stress would be created upon each layer that has another layer laid upon it. Since no external force is applied to the deposited layers, the stress is deemed intrinsic.

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Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 571-272-1838. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



ML

December 23, 2005

Mary Wilczewski
Primary Examiner

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A handwritten signature in black ink, consisting of a large, stylized 'M' followed by a long horizontal stroke.

Mary Wilczewski
Primary Examiner